IN THE CLAIMS:

1. (CANCELLED)

2. (CURRENTLY AMENDED) The method as recited in claim ~~1~~ further ~~including~~ comprising the steps of:

~~(c)~~ compressing a refrigerant to ~~said~~the high pressure;

~~(d)~~ cooling ~~said~~the refrigerant;

~~(e)~~ expanding ~~said~~the refrigerant; and

~~(f)~~ evaporating ~~said~~the refrigerant.

3. (CURRENTLY AMENDED) The method as recited in claim 2 further ~~including~~ comprising the steps of:

~~(g)~~ controlling a flow of ~~said~~the refrigerant through the step of cooling; and

~~(h)~~ adjusting the step of controlling ~~said flow~~ to obtain ~~said~~the desired high pressure.

4. (CURRENTLY AMENDED) The method as recited in claim 2 wherein ~~said~~the refrigerant is carbon dioxide.

5. (CURRENTLY AMENDED) The method as recited in claim ~~1~~ wherein ~~said~~the desired high pressure obtains a maximum coefficient of performance.

6. (CANCELLED)

7. (CURRENTLY AMENDED) A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

operating the system based on a model, and an adaptive control algorithm having variable coefficients operates the model;

exciting the system with an excitation signal to generate a system output;

comparing the system output to a model output of the model; and

adapting the model to obtain a desired high pressure of the system by ~~The method as recited in claim 6 wherein an adaptive control algorithm having variable coefficients operates said model, and the step of adapting said model includes~~ modifying ~~said~~the variable coefficients such that ~~said~~the model output of ~~said~~the model substantially equals ~~said~~the system output of the system.

8. (CURRENTLY AMENDED) The method as recited in claim 7 wherein the step of comparing ~~the system output to said model output~~ determines a system identification error.

9. (CURRENTLY AMENDED) The method as recited in claim 8 wherein the step of adapting ~~said model includes employing said~~utilizes the system identification error.

10. (CURRENTLY AMENDED) A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

operating the system based on a model; and

adapting the model to obtain a desired high pressure of the system, ~~The method as recited in claim 1~~ wherein the step of adapting ~~the model~~ further includes the steps of:

1) sinusoidally exciting the system with an exciation signal to generate a response;

2) filtering ~~said~~the response to generate a harmonic response;

3) multiplying ~~said~~the harmonic response by ~~said~~ the excitation signal to demodulate ~~said~~the harmonic response to a demodulated harmonic response;

4) filtering an oscillation factor from ~~said~~the demodulated harmonic response to separate a static gain; and

5) utilizing ~~said~~the static gain as a new excitation signal.

11. (CURRENTLY AMENDED) A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

operating the system based on a model; and

adapting the model to obtain a desired high pressure of the system, ~~The method as recited in claim 1~~ wherein the step of adapting ~~the model~~ further includes the steps of:

1) establishing a left input point, a right input point, and a middle input point therebetween;

2) determining a coefficient of performance for each of ~~said~~the left input point, ~~said~~the right input point, and ~~said~~the middle input point;

3) determining a left middle coefficient of performance of a left middle input point between ~~said~~the left input point and ~~said~~the middle input point and determining a right middle coefficient of performance of a right middle input point between ~~said~~the right input point and ~~said~~the middle input point;

4) comparing ~~said~~the left middle coefficient of performance and ~~said~~the right middle coefficient of performance;

5) determining which of ~~said~~the left middle coefficient of performance and ~~said~~the right middle coefficient of performance is a greater value;

6) ~~utilizing said greater value as~~determining a new middle input point that corresponds to the greater value; and

7) repeating step 1) to step ~~6~~5) employing ~~said~~the new middle input point as ~~said~~the middle input point.

12. (NEW) The method as recited in claim 10 further comprising the steps of:
compressing a refrigerant to the high pressure;
cooling the refrigerant;
expanding the refrigerant; and
evaporating the refrigerant.

13. (NEW) The method as recited in claim 12 further comprising the steps of:
controlling a flow of the refrigerant through the step of cooling; and
adjusting the step of controlling to obtain the desired high pressure.

14. (NEW) The method as recited in claim 12 wherein the refrigerant is carbon dioxide.

15. (NEW) The method as recited in claim 10 wherein the desired high pressure obtains a maximum coefficient of performance.

16. (NEW) The method as recited in claim 10 further comprising the step of repeating steps 1) to 5) utilizing the new excitation signal as the excitation signal.

17. (NEW) The method as recited in claim 11 further comprising the steps of:
compressing a refrigerant to the high pressure;
cooling the refrigerant;
expanding the refrigerant; and
evaporating the refrigerant.

18. (NEW) The method as recited in claim 17 further comprising the steps of:
controlling a flow of the refrigerant through the step of cooling; and
adjusting the step of controlling to obtain the desired high pressure.

19. (NEW) The method as recited in claim 17 wherein the refrigerant is carbon dioxide.

20. (NEW) The method as recited in claim 11 wherein the desired high pressure obtains a maximum coefficient of performance.

21. (NEW) The method as recited in claim 11 wherein the step of repeating utilizes the middle input point as the left input point if the right middle coefficient of performance is the greater value, and the step of repeating utilizes the middle input point as the right input point if the left middle coefficient of performance is the greater value.

22. (NEW) A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

compressing a refrigerant to the high pressure;

cooling the refrigerant with a fluid;

expanding the refrigerant;

evaporating the refrigerant;

operating the system based on a model;

adapting the model to obtain a desired high pressure of the transcritical vapor compression system;

exciting the system with an excitation signal to generate a system output;

comparing the system output to a model output of the model; and

adjusting the high pressure of the system by adjusting a flow rate of the fluid in the step of cooling based on the step of comparing.